Indiana Michigan Power Company

Smart Metering and Distribution Automation Project Proposal For the Michigan Public Service Commission

October 8, 2007

Overview

The Energy Policy Act of 2005 and the Michigan 21st Century Energy Plan have outlined a comprehensive plan to meet our future energy needs in a way that will delay the need for additional generation, improve the quality of service, and enable more consumers to participate in energy conservation efforts.

Indiana Michigan Power (I&M) and its parent company American Electric Power (AEP), have continuously been involved in monitoring technological advancements and industry trends. We believe that sufficient advancements have been made in the technologies surrounding AMI, smart metering, home automation, and distribution automation to implement a larger scale deployment.

I&M proposes that the first large scale deployment in AEP's system wide GridSMART initiative occur in its Michigan service territory involving all of its approximately 130,000 customers and 123 distribution circuits. An AMI network would be installed, serving as the platform for smart metering and distribution automation as well as enabling consumer conservation efforts and increased participation in demand response programs. I&M will use this deployment to evaluate the costs and potential benefits of smart metering and distribution automation, as well as the effectiveness of demand response initiatives in producing consumer conservation.

I&M proposes to install technology that will provide customers with more information on how and when they spend their energy dollars, provide more rate options and new service offerings, validate utility operational savings opportunities and improve service reliability. The project will include new time of use rates, direct load control offerings, remote connect/disconnect, and pre-pay metering services.

I&M believes that the deployment of smart metering and distribution automation, in conjunction with appropriate and timely cost recovery granted by the MPSC, will support the goals of Michigan's 21st Century Energy Plan.

<u>AMI Networks</u>

AEP has established a technology testing facility at its Dolan Laboratory in Groveport, Ohio, where various AMI technologies are installed and their performance validated. AEP is currently evaluating:

- Communications technologies, including RF Mesh and WiMax systems. AEP/I&M believe there are significant advances forthcoming in the near term.
- Distribution automation devices and systems that will leverage AEP's communications investments.
- Home area networks (HAN) to test functionality and features of emerging technologies in this market.
- The potential of having both advanced metering and distribution automation share a common communication network.

Network testing should be complete by the end of the first quarter in 2008 with a final technology selection following.

Smart Metering

I&M proposes to install AMI equipped meters that will not only provide monthly billing readings, but will also provide:

- Hourly, daily, or on demand readings
- Monthly, daily, or hourly interval data
- Power quality information in real time
- Outage and restoration information
- Usage information and pricing signals to in-home load management devices and smart appliances as well as through a web portal
- Remote connect and disconnect on all single phase 200 amp services
- Prepaid metering option

The installation of smart metering will enable more consumers to participate in energy conservation and demand response as well as improve our ability to provide reliable and efficient service to our customers.

Distribution Automation

I&M is proposing to monitor 100% of the distribution circuits in Michigan and have remote supervisory control of 50% of those circuits. Switches, reclosers and capacitor banks will be linked to the AMI network, with a central Distribution Management System monitoring all devices.

This automation will improve our ability to analyze and respond to outages, minimize outage time, and improve the distribution system reliability and quality.

Evaluation Plan

From a customer perspective, I&M will evaluate the market acceptance of the new technologies and rate structures, and the subsequent changes in consumption and consumption patterns.

From an operational perspective I&M will evaluate the benefits of remote connect and disconnect, tamper alerts, daily readings, prepay metering, and the performance of the communication network.

Smart Metering

I&M will conduct surveys of a random sample of Michigan customers prior to the implementation of the program. The purpose of the survey is to collect current demographic information, interest in new products and services (TOU rates, pre-pay

metering, DLC and others), attitudes toward and awareness of conservation of electricity, appliance holdings, HVAC systems, etc.

In addition, I&M will perform the same surveys on a random sample of our customers outside of Michigan, which will serve as a control and comparison group. To reduce costs, I&M will explore the viability of using part of its existing load research sample in Michigan as a proxy for the control group.

After the marketing of the program has been completed, I&M will administer a brief survey to those who did not choose to participate which will address the barriers to participation.

Customer-specific measurements of each offering include:

- Participation rates
- Energy shifted from on-peak to off-peak periods
- Demand reduction during coincident peak hours
- Energy consumption reductions
- Changes in the number of credit and collection related disconnects for the area before and after prepay offering
- Reduction in deposit requirements due to prepay metering

Field-specific measurements include the performance of the AMI devices as well as the effectiveness of the communication network:

- % of meters read (number of actual bills, timeliness of reads, number of attempts)
- Accuracy of meter reads
- Number of field trips avoided to obtain reads (opens and closes completed w/o field trip or estimation)
- Number of reconnect/disconnects completed remotely
- Number of tamper alerts logged vs. those reported by meter readers.

<u>Distribution Automation</u>

I&M will evaluate the benefits of distribution automation by tracking the following criteria:

- Three year average comparisons for SAIFI and SAIDI
    - Note that it is anticipated that the MAIFI index will increase due to the increased quality and quantity of reports provided by smart meters.
- Number of field trips made to investigate individual customer reports of no power or partial power before and after the installation
- Number of proactive capacitor off-line and out of service notifications

Appendix

Number of I&M Michigan metered customers and percent participating in demand response

Customer Classification	Number Of Customers[1]	Demand Response[2]	% Participation
Residential	112,257	6,586	5.8
Commercial	18,388	388	2.1
Industrial	163	163	100
Governmental	857		
FERC	14		
Total Customers	131,679	7,137	5.4

[1]Number of customers is the actual number of meters installed as of 9-7-07.
[2]Demand response is the number of customers on a TOU rate, or utilizing off peak hour equipment for which a credit is applied.

Classification of meters currently deployed as of 9-7-07

Single Phase	Poly Phase Self Contained	Transformer Rated	Total Meters
125,893	2,081	3,705	131,679

Michigan service territory and distribution automation devices included in the project

Operational Square Miles	Asset Square Miles	Circuits	Reclosers	Switches	Capacitors
2,341	2,001	123	108	60	186

Deployment plan

Year 1:
- Install AMI network
- Install 100% of singlephase meters
- Install 50% of polyphase and transformer rated meters
- Install Distribution Automation equipment on 30 circuits
  - 45 electronic controlled reclosers
  - 60 GOAB switches
  - 60 capacitor banks

Year 2:
- Install remaining 50% of polyphase and transformer rated meters
- Install DA equipment on 30 circuits
  - 45 electronic controlled reclosers
  - 60 GOAB switches
  - 60 capacitor banks

Year 3:
- Install DA equipment on 63 circuits for monitoring only
  - 63 electronic reclosers
  - 126 capacitors